

REMARKS

Claims 1-8 were pending prior to the present amendments.

Claim 8 is amended to an independent claim.

Claims 9-26 are newly entered.

Reconsideration on the merits is respectfully requested.

The application is believed to be in condition for allowance for the reasons set forth herein. Notice thereof is respectfully requested.

Claim Rejections - 35 USC § 102

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Higgins et al. (USP 5,879,715).

The Office opines that Higgins et al. teaches the invention as claimed.

Higgins et al. in claim 1 discloses:

"A process for production of inorganic nanoparticles comprising the steps of:

- a) precipitating the inorganic nanoparticles within a non-continuous micellar phase in a microemulsion containing a non-continuous micellar phase and a continuous phase; and
- b) concentrating the nanoparticles for recovery by ultrafiltration employing a semipermeable membrane with a pore size selected to retain substantially all the nano-particles

precipitated in the micellar phase, while permeating a permeate stream of the microemulsion continuous phase and the micellar phase not containing precipitated nanoparticles."

Applicant contends that the invention of claim 1 is clearly distinguished over that disclosed in Higgins et al. by not requiring the precipitation process to be carried out in the presence of microemulsions, which in Higgins et al. are defined at col. 1, lines 22-26:

"as a thermodynamically stable, optically isotropic dispersion of two immiscible liquids consisting of nano-size domains of one or both liquids in the other, stabilized by an interfacial film of surface-active molecules".

Furthermore, the "compounds capable of preventing agglomeration of the nanoparticles of the dispersion" disclosed in the present invention, namely thioglycerol, glycerol, polyphosphates, polyphosphoric acid and hexametaphosphates, cannot be regarded as surfactants, since surfactants are merely surface active species and would be insufficiently strongly absorbed on the surface of the nano-particles to prevent agglomeration. This is clear from the need of a micro-emulsion with nano-sized cells in order to obtain nano-particles, according to the invention of Higgins et al. Furthermore, although the Office refers to thioglycerol and polyphosphoric as

surfactants, this is clearly incorrect, since Vacassy refers to thioglycerol as a strong complexing agent and Higgins et al. refers to mineral acids as precipitating agents or reactants.

Applicant respectfully request withdrawal of the rejection of claim 1 over Higgins et al. under 35 U.S.C. §102(b).

Claim Rejections - 35 USC § 103

Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins et al. (US 5,879,715) in view of Vacassy et al.

Higgins et al. is applied as before.

Vacassay et al. is cited as specifying the use of the surfactant thioglycerol in the formation of nanoparticles of ZnS by precipitating cations and anions. The Office opines that Vacassay suggest Mn doping of the ZnS and that it would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the references because Higgins et al. suggests such precipitation and ultrafiltration process for chalcogenides and Vacassay et al. describes the

precipitation process for such chalcogenide.

Applicants respectfully disagree.

The inventions of claims 2 to 7 are clearly distinguished over that disclosed in Higgins et al. by not requiring the precipitation process to be carried out in the presence of microemulsions, which in Higgins et al. are defined at col. 1, lines 22-26, "as a thermodynamically stable, optically isotropic dispersion of two immiscible liquids consisting of nano-size domains of one or both liquids in the other, stabilized by an interfacial film of surface-active molecules". Furthermore, the only surfactants specified in Higgins et al. are: polyoxyethylene-nonylphenol ethers, cetyl trimethylammonium bromide and Triton® X-100.

The Office appears to suggest that surfactants are capable of preventing agglomeration of the nanoparticles of the dispersion. However, the "compounds capable of preventing agglomeration of the nanoparticles of the dispersion" disclosed in the present invention, namely thioglycerol, glycerol, polyphosphates, polyphosphoric acid and hexametaphosphates, cannot be regarded as surfactants, since surfactants are merely surface active species and would be insufficiently strongly

absorbed on the surface of the nano-particles to prevent agglomeration. This is clear from the need of a micro-emulsion with nano-sized cells in order to obtain nano-particles, according to the invention of Higgins et al. Although the Examiner, refers to thioglycerol and polyphosphoric as surfactants, this is clearly incorrect, since Vacassy refers to thioglycerol as a strong complexing agent and Higgins et al. refers to mineral acids as precipitating agents or reactants.

Vacassy et al. discloses a preparation process in which zinc sulphide nanoparticles are prepared in the presence of thioglycerol, which is described as a strong complexing ligand, which influences the kinetics of the primary particle agglomeration/growth. A strong ligand will be strongly adsorbed on the surface of the zinc sulphide particles, whereas such is not the case with a surfactant. Vacassay et al. provides no hint or indication of the benefit or desirability of performing diafiltration or ultrafiltration on the dispersion of zinc sulphide particles produced by this synthesis process.

The Examiner attempts to make a link between Vacassy et al. and Higgins et al. by referring to thioglycerol as a surfactant, which clearly it is not, and thence to the mention of

surfactants in Higgins et al. We contend that that one skilled in the art would not regard thioglycerol as a surfactant and hence would have no motivation or incentive to combine the teachings of Higgins et al. and Vacassy et al.

We therefore contend that claims 2 to 7 are patentable under 35 U.S.C. §103(a) over Higgins et al. in view of Vacassy et al.

New Claims

Claims 9-26 are newly entered claims supported by the disclosure at page 5 lines 1-3 of the specification. No new matter is entered with the new claims.

New claim 12 recites that the "compound capable of preventing agglomeration of the nanoparticles of the dispersion" is added to the predispersion after preparation of the predispersion and before the "diafiltration and/or ultrafiltration washing step" is performed.

New claim 19 discloses the use of glycerol as the "compound capable of preventing agglomeration of the nanoparticles of the dispersion".

New claim 23 discloses the use of a polyphosphate or polyphosphoric acid as the "compound capable of preventing agglomeration of the nanoparticles of the dispersion".

Claims 9-26 represent patentable advances in the art.

Allowable Subject Matter

Claim 8 was objected to as being dependent upon a rejected base claim. Claim 8 has been amended to include all limitations of the base claim and any intervening claims.

Claim 8 is in condition for allowance.

CONCLUSIONS

Claims 1-26 are pending in the present application. All claims are in condition for allowance. Notice thereof is respectfully requested.

Respectfully submitted,


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